

Failure Modes and Effects Analysis/Critical Items List

Document Number: JSC-38378 **Document Rev. No.:** C **Document Date:** 8/26/97
Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: Control Electronics Assembly (CEA) **Qty:** 1 **FMEA Number:** US-SFR-230
Item Part Number: SED33107324 **ORU Name:** SAFER
Subsystem Name: Avionics **ORU Part Number:** SED33105900-311
Function: Provides computing capability for control software, I/O for instrumentation, hand controller, and thrusters and filters noise from instrumentation output signals.

Item Type Designator: C **PG/IP Identifier:** N/A
Reference Designator/Find No.: N/A **Drawing Number:** SED33107324
Logistics Control Number: N/A

End Item Name: SAFER
End Item Capability: Six degrees of freedom through 24 thrusters, each rated at 0.8 ± 0.08 lbs. force in vacuum.
End Item Function: Provides emergency EVA self-rescue for separated crewmember.
ISS Zone: EVA **Shuttle Zone:** EVA

		Criticality		
Critical Item:	Yes: <input type="checkbox"/>	No: <input checked="" type="checkbox"/>	Criticality Category:	ISS 1R
Success Paths:			Success Paths Remaining:	Shuttle 1R/3

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: CEA fails to send commands to VDA.
Failure Mode Code:
Failure Cause: EEE part failure, short/open circuit, contamination, software error, radiation event, EMI.
Failure Detection:
Flight: IVA – IVA checkout.
 EVA – No “fire” command to NSI. No thruster response to control inputs.
Ground: Functional Test.
Time To Detect Quantity: 10 **Time To Detect Units:** Seconds
Correcting Action: IVA – If a failure is detected during the IVA checkout, the back-up SAFER (if available) will be used.
 EVA – Cycle power. If not successful, no other corrective action.
Remarks: None
Failure Effect Phase: EVA Operations **Affected Stage(S):** EVA Operations

Failure Effect

On ORU/Assembly:
First/Second Failure: Inadvertent EVA crewmember separation.
Third (this) Failure: Hand controller inputs do not produce thruster output. Unable to arrest motion.
On Subsystem/Next Assembly: Valve driver does not receive command information
On End Item/Segment: Prevents self rescue.
On Crew/ISS: Possible loss of EVA crewmember and/or damage to structure.
Time To Effect Quantity: 1 **Time To Effect Units:** Minutes

Redundancy Screen

ISS	(Shuttle)			
Checkout Pre-Launch	(A):	Pass		
Checkout On-Orbit	(B):	N/A		
Detection Flight Crew:		Pass	Or	Detection Ground Crew: Fail
Loss Of Redundancy From A Single Cause	(C):	N/A		